Management Advisory Report: Comprehensive Measures for Interim Business Systems Modernization Status Reporting Are Needed

July 2002

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INSPECTOR GENERAL
for TAX
ADMINISTRATION

DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

July 10, 2002

MEMORANDUM FOR DEPUTY COMMISSIONER FOR MODERNIZATION &
CHIEF INFORMATION OFFICER

FROM: Pamela J. Gardiner
Deputy Inspector General for Audit

SUBJECT: Final Management Advisory Report - Comprehensive Measures for Interim Business Systems Modernization Status Reporting Are Needed (Audit # 200120041)

This report presents the results of our review and analysis of measures for the Business Systems Modernization (BSM) program. The overall objective of this review was to assess the Internal Revenue Service's (IRS) plans for monitoring and reporting to the Congress the BSM's program-level status for cost, schedule, and quality.

The IRS has recently begun requesting BSM funding for an entire year. This is an increase in the funding period from previous requests. Since the time between funding requests has increased, the IRS has identified the need to produce periodic status reports on the modernization program for the Congress and other interested stakeholders.

In summary, the Business Systems Modernization Office (BSMO) is currently generating monthly internal reports on the status of modernization projects, and plans to design a comprehensive periodic report for external decision-makers. BSMO management has acknowledged that a different set of reports may be needed for external reporting.

To assist the BSMO in developing an external reporting process, we reviewed "best practices" literature, and conducted interviews with individuals from private industry, the IRS, and other government agencies. This report provides details on our research and suggestions to assist the BSMO in developing a comprehensive set of interim status reports.

Management's Response: BSMO management requested an extension to respond to our draft report from June 28, 2002, to July 5, 2002. As of July 8, 2002, management had not responded to the draft report.

Copies of this report are also being sent to the IRS managers who are affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions or Scott E. Wilson, Assistant Inspector General for Audit (Information Systems Programs) at (202) 622-8510.

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Background

The Internal Revenue Service (IRS) is currently modernizing its computer systems and its business processes and practices. This multi-billion dollar effort, known as Business Systems Modernization (BSM), is projected to last up to 15 years.

The Congress controls funding for the BSM effort by allocating funds from an investment account. The IRS provides the Congress justification for a release of funds by submitting BSM expenditure plans. Until recently, the IRS submitted expenditure plans sporadically that resulted in a lengthy approval process and, in some cases, funding gaps.

In a previous audit, we recommended that the IRS consider alternative funding strategies that would benefit the IRS and the Congress.[1] The IRS now submits annual expenditure plans for the upcoming fiscal year, which should stabilize the BSM funding process. Since the time between BSM expenditure plans has increased, the IRS has identified the need to produce periodic status reports on the BSM program for the Congress and other interested stakeholders.

The objective of this audit was to assess the IRS' plans for monitoring and reporting to the Congress the BSM's program-level status for cost, schedule, and quality.[2] The IRS requested an audit of how effectively the Business Systems Modernization Office (BSMO)[3] was overseeing the PRIME contractor.[4] This audit is one of several audits designed to provide input on this topic.

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[1] *The Business Systems Modernization Office Has Made Solid Progress and Can Take Additional Actions to Enhance the Chances of Long-Term Success* (Reference Number 2001-20-039, dated February 2001).

[2] The objective of this review did not include a review of the entire internal performance measurement program within the BSMO. While information is presented within this report on this subject, this is only to add perspective.

[3] The IRS created the Business Systems Modernization Office (BSMO) to oversee the Business Systems Modernization effort.

[4] The PRIME is a group of leading companies brought together by the Computer Sciences Corporation to provide the IRS with access to commercial best practices, guarantee access to viable alternative solutions, and streamline the systems acquisition process.

To accomplish our objective, we obtained and reviewed documentation and conducted interviews with individuals from private industry, the IRS, and other government agencies. The audit was conducted at the IRS' National Headquarters Office and the BSMO facilities in New Carrollton, Maryland, between October 2001 and February 2002 in accordance with *Government Auditing Standards*.

Detailed information on our audit objective, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.

Comprehensive Measures for Interim Business Systems Modernization Status Reports Should Be Developed

Since the time between BSM expenditure plans has increased, the IRS has identified the need to produce periodic status reports on the BSM program for the Congress and other interested stakeholders. Without comprehensive status reports to help keep the Congress informed on the progress of the BSM program between expenditure plans, the BSMO could experience lengthy funding approvals and funding gaps.

While the BSMO has not started issuing interim external reports to the Congress, it has been actively working on performance reporting. In 2001, the BSMO was developing its Performance Management Program based on a best practices framework. This program identifies specific project performance measures. The program also includes data collection and verification, analysis, and reporting processes. Per BSMO management, BSM risks and issues are used to determine what measures should be collected. The BSMO has also created a reporting tool called a "dashboard",[5] which displays project measurements. We reviewed the dashboard and agreed that it would be a good tool to help monitor the modernization contractors' performance.

The dashboard, however, is not the best vehicle for reporting overall BSM program progress to external

[5] The IRS "dashboard" is a reporting vehicle reflecting the current status of cost and schedule (by task order), as well as other performance measures, with respect to each ongoing BSM project. The status is reflected as a color condition (green for go, yellow for the existence of risk factors, and red for high risk).

stakeholders, such as the Congress. The dashboard is fairly technical and presents information at a point in time, rather than as a trend.

Based on our initial review of the dashboard, we believe a separate reporting vehicle should be developed that focuses on the following topics:

- **Quality measures** – Measurements could be made to determine the percentage of user requirements that were delivered and the number of deficiencies found in a system once released. See example reports in Appendix VI – Pages 24 and 26.
- **Expenditure plan comparisons versus task order comparisons** – Measurements could be made against goals released to external stakeholders in the expenditure plans versus measurements made against internal contracts. See example reports in Appendix VI – Pages 23 and 28.
- **Trending results versus static results** – Measurements could be presented as a trend to give a clearer picture of program progress over time, rather than providing only one point in time. See example reports in Appendix VI – Pages 22 and 23.

Management Actions: During our review, the BSMO was tracking cost and schedule measures. Also, the BSMO was developing non-cost and non-schedule measures. BSMO management stated that three additional measures (product quality, business value, and functional stability) would be tracked by June 2002. All measures will be displayed on the BSMO dashboard, which is currently used by BSMO executives.

The BSMO had not yet initiated interim status reporting to the Congress because it had been developing the foundation for comprehensive performance measures. Since external reports had not been designed, we decided to determine what information would be appropriate for external reporting. To accomplish this, we discussed the type of information that would be helpful with a Congressional staff member, reviewed relevant legal requirements, and obtained information on "best practices" from both private industry and other government agencies.

Congressional Needs

We obtained Congressional input through discussion with a key staff member for the Senate Finance Committee. The major categories of interest for monitoring BSM progress were:

- **Cost trends** – This would provide perspective on the accuracy of IRS cost estimates over time, and be a factor in considering the appropriate level of future funding for the BSM program.
- **Progress of the BSM program** – This would provide perspective on how well the IRS is meeting its commitments to deliver benefits to taxpayers. Trends in the IRS' ability to deliver on its commitments would be a gauge as to the level of congressional oversight necessary for the BSM program.

Relevant Legal Requirements

We reviewed the Government Performance and Results Act (GPRA)[6] to determine any requirements for performance reporting. The GPRA requires comparing actual program results with established performance goals, and suggests providing multiple iterations of data for trend purposes. The GPRA also suggested that program activities be logically grouped. For example, the BSM program conducts several different types of activities (program level activities, systems development projects, etc.).

Best Practices

We studied the Software Acquisition Capability Maturity Model (SA-CMM)[7] and interviewed a software acquisition measurements expert. We also reviewed Software

[6] Government Performance and Results Act of 1993 (GPRA), Pub. L. No. 103-62, 107 Stat. 285 (codified as amended in various sections of 5 U.S.C., 31 U.S.C., and 39 U.S.C.)

[7] The Capability Maturity Model (CMM) was developed by the Software Engineering Institute. The Software Acquisition CMM is a structured process that helps organizations improve their abilities to consistently and predictably acquire high-quality information systems.

Engineering Institute[8] documentation to obtain potential performance measurements. The BSMO has a goal of being rated at Level II on the CMM scale by the end of 2002. Part of the requirements to be rated at a CMM Level II is that organizations have processes for overseeing contracts and documented procedures for internal operations. In addition, an organization should maintain a corrective action system for issues discovered as a result of contract oversight activities. Periodic status reports could help the IRS meet these CMM requirements.

We also reviewed various articles on measuring performance in the Government and in the private sector. One reporting method is known as the Balanced Scorecard,[9] which we believe could be used to ensure that all facets of performance measures are included in the scope of external reports.

Finally, we conducted interviews with nine government agencies that are or have been involved in a major systems modernization effort. We requested information on the type of measures collected and the type of reports produced. See the table in Appendix IV for our results. See Appendix V for the most comprehensive reporting model we obtained.

Based on our analysis and knowledge of the BSM program, we captured potential measures and reports for each Balanced Scorecard component.[10] We have included examples of these measures and reports in Appendix VI. While the information presented in Appendix VI is quite voluminous, the purpose for including each chart/graph is merely to provide examples of measurements and measurement formats. We favor the model outlined in Appendix V, but believe that selected aspects of the other

[8] The Software Engineering Institute is a federally funded research and development center sponsored by the U.S. Department of Defense and operated by Carnegie Mellon University.

[9] Robert S. Kaplan and David Norton published, in the mid 1990's, several articles on the Balanced Scorecard in the Harvard Business Review.

[10] The Balanced Scorecard includes four dimensions, or components: internal business, innovation and learning, customer, and financial.

examples can be combined with this model to create a concise, quality report.

In conclusion, the IRS is in the early phases of a potential 15-year effort to modernize its systems. Initial performance analysis efforts focused mainly on cost and schedule measures. The *National Partnership for Reinventing Government* stated that initial efforts to measure performance usually focus "…on what is done, that is primarily output, activity, or work related measures. The next stage moves toward more outcome-oriented measures, recognizing the need to measure impact or results. Most Federal agencies are at this stage now as they struggle to implement the Government Performance and Results Act and achieve their mission or business results. Beyond this stage, comes the recognition of the importance of the organization's learning and growth and customer perspectives. High performing results-based management organizations in the private sector have been focusing not just on financial, but also on internal business, customer, and employee perspectives."[11]

To assist the BSMO in progressing to the next stage of measurement for the BSM program, we suggest that BSMO management create comprehensive, yet concise, interim status reports that provide value for internal and external stakeholders by taking the following items into consideration. It may be practical to begin reporting using only those measures that are currently available, and improving reporting as time progresses.

- Project data needed for status reporting should be collected from all modernization contractors.
- All components or dimensions of the Balanced Scorecard should be included.
- Data should be presented in a trend format, when possible.
- Financial measurements should be compared to expenditure plan data.

[11] *National Partnership for Reinventing Government*, August 1999.

- Projects should be grouped for analysis, e.g., program management efforts, infrastructure projects, non-infrastructure projects.
- A corrective action system should be in place that is linked to the reporting process. This could be accomplished as part of the dashboard effort, versus the external reporting vehicle.
- The reporting and monitoring aspects of this effort should be documented as a process improvement for software acquisition maturity rating purposes.
- The usefulness and success of performance metrics should be reviewed periodically for improvement.

Management's Response: BSMO management requested an extension to respond to our draft report from June 28, 2002, to July 5, 2002. As of July 8, 2002, management had not responded to the draft report.

Appendix I

Detailed Objective, Scope, and Methodology

Our overall audit objective was to assess the Internal Revenue Service's (IRS) plans for monitoring and reporting to the Congress the Business Systems Modernization (BSM) program-level status for cost, schedule, and quality. To accomplish this objective, we

I. Determined if the IRS' processes for gathering and maintaining project data were sufficient to support program-level analysis and reporting.

   A. Determined how other government agencies that were involved in systems modernization were monitoring projects and tracking program status.

   B. Researched project management literature (Software Engineering Institute, Center for Project Management, etc.) to identify best practice cost, schedule, and quality metrics.

   C. Interviewed Business Systems Modernization Office (BSMO) and MITRE Corporation[1] staff to determine the availability and source of project data.

   D. Interviewed two BSMO contracting specialists and conducted interviews with IRS procurement personnel to determine what quality measurements were possible.

   E. Determined the processes for ensuring that project data being gathered for monitoring purposes was accurate.

   F. Interviewed IRS management and Management Information Center/MITRE staff to determine if the IRS had adequately defined cost/schedule baselines for modernization projects.

   G. Determined if the process of gathering and maintaining project data was a documented, and thus, repeatable process.

   H. Determined if all modernization projects were subject to the same monitoring requirements.

II. Evaluated the IRS' plans to publish a program-level status report for the BSM.

   A. Determined how other government agencies that were involved in systems modernization were reporting status at the program level.

[1] The MITRE Corporation provides the IRS with specific expertise in establishing strategic priorities, making investment decisions, evaluating proposals, managing the systems modernization program, monitoring contracts, performing specific research, and conducting testing activities.

B. Interviewed BSMO/MITRE Corporation staff to determine what program-level measurements were being gathered or could be gathered using existing project data.

C. Interviewed the IRS Director of Financial Policy, Planning, and Programs and BSMO/MITRE Corporation staff to identify suggestions and processes for program-level reporting of BSM results.

Appendix II

Major Contributors to This Report

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Appendix III

Report Distribution List

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Audit Liaison:
Associate Commissioner, Business Systems Modernization M:B

Appendix IV

Comparison of High-Level Reporting for Major Software Development Projects in Government Agencies

Explanation: We interviewed nine government agencies that are or have been involved in a major software development project. Based on our interviews and documentation obtained, we created this summary chart to show nine issues and whether the issues were covered in each agencies reporting process. If the issue was covered, the block below the issue is blackened. The most comprehensive report was from agency five. This report is depicted in Appendix V.

GOVERNMENT AGENCIES
Comparison of High-Level Reporting for Major Software Development Projects

AGENCY #	ISSUE								
	COST	SCHEDULE	QUALITY	REQUIRE-MENTS	RISK	STAFFING	TRANSITION TO SUPPORT	FUNDING	DEFECTS
1	■	■	■	■	■	■		■	■
2	■	■	■						
3	■	■	■	■	■			■	■
4	■	■	■						
5	■	■	■	■	■	■	■	■	■
6	■	■	■	■				■	
7	■	■							
8	No Data Obtained								
9									

■ Denotes that the agency had a high-level report depicting this information.

□ Denotes that the agency did not have a high-level report depicting this information.

Source: Discussions and documentation received from other government agencies.

Appendix V

Comprehensive Reporting Model for Government Agencies

Cost	Green	Yellow	Red	Rational
Cost Performance				
Cost Profile (Baseline Vs. Actual)	within 5% of Plan	Within 10% of Plan	Greater than 10% from Plan	Standard Thresholds
Earned Value (CPI)	>0.95	0.9 - 0.95	<0.90	Standard Thresholds
Funding				
By Year	Budget within 5% of Estimated Requirements any given year	Budget within 10% of Estimated Requirements any given year	Budget > 10% difference from Estimated Requirements Any Given Year	Program Executability with Implication that Key Milestones will be slipped or functionality delayed if full funding is not available according to requirements/plan. Requirements & Baseline must formally defined/approved for this criteria to apply
CAPITAL Allocation	Capital Allocation within 5% of Estimated Requirements any given year	Capital Allocation within 10% of Estimated Requirements any given year	Capital Allocation > 10% difference from Estimated Requirements Any Given Year	Program Executability with Implication that Key Milestones will be slipped or functionality delayed if full funding is not available according to requirements/plan. Requirements & Baseline must formally defined/approved for this criteria to apply
Contracts				
Burn Rate (T&M)	Within 5% of Planned Rate	Within 10% of Planned Rate	Greater than 10% difference from Planned Rate	Standard Thresholds
Contractor Experience	Aggregate Experience 90% of Planned or greater	Aggregate Experience 51-90% of Planned	Aggregate Experience 50% of Planned or less	Derived from Differential Analysis of COCOMO II Cost Factors (12% turnover assumed as baseline) 50% decrement in Experience levels equates to a 10% cost/schedule hit
Contractor Staffing	Turnover Rate within 25% of Plan	Turnover Rate between 25% and 100 % of Plan	Turnover Rate 2x >plan	Derived from Differential Analysis of COCOMO II Cost Factors (12% turnover assumed as baseline) 100% (from 12% to 24%) change in turnover rate equates to a 10% cost/schedule hit
Contracts In place	Slip < 30 Days	Slip 30-90 Days	Slip > 90 Days	Linked to schedule Thresholds

Source: Defense Logistics Agency (Department of Defense 5000 Series, COCOMO Model (Boehm et. al)). ***NOTE****: This chart has been edited of program-specific information for presentation purposes. Used with permission.*

Comprehensive Reporting Model for Government Agencies

Schedule	Green	Yellow	Red	Rational
Schedule Performance				
Earned Value (SPI)	>0.95	0.9<=0.95	<0.90	Standard Thresholds
*Critical Path Analysis**	*Slip < 30 Days*	*Slip 30-90 Days*	*Slip > 90 Days*	Indicated by Analysis Standard Thresholds
Milestone Dates	*Slip < 30 Days*	*Slip 30-90 Days*	*Slip > 90 Days*	Standard Thresholds
Schedule Compression	Nominal Duration	Duration 90% of Nominal	Duration 87% of Nominal	Schedule Incompressibility (15% Compression= 14% cost increase), based on COCOMO II Software Development/Software Integration Models Captures phenomenon that schedule can be compressed (at increased cost) only up to a certain point. A reduction of 25% is the maximum practical limit.
Implementation				
Training	Workforce Trained or on track to be trained	Training Requirements Identified or Training proceeding with less than 10% deviation from plan	No Training Plan / Concept or training proceeding, but > 10% deviation from plan	Delay in major implementation element implies overall program delay and or churn
Infrastructure	IT Infrastructure identified and verified in place	Infrastructure Requirements Identified / planned or less 10% deviation from plan	Infrastructure Requirements Not Identified or planned or deviation >10% from plan	Historically, integration with existing infrastructure has always been a stumbling block. Early identification of infrastructure requirements and validating/addressing those issues are keys to successful implementation
Installation	Planned and or proceeding according to plan	Planned or less than 10% deviation from Plan	Not Planned or > than 10% deviation from Plan	Strong Correlation with schedule performance. Typically, installations are resource constrained (personnel) and once significant slippage occurs, cannot be made up
Security	Approved	will not support existing schedule	Process not started	Major hurdle
Transition	Transition Plan In Place	Transition Plan in Draft	No Transition Plan	

Source: Defense Logistics Agency (Department of Defense 5000 Series, COCOMO Model (Boehm et. al)). ***NOTE:*** *This chart has been edited of program-specific information for presentation purposes. Used with permission.*

Comprehensive Reporting Model for Government Agencies

Performance	Green	Yellow	Red	Rational
Project Risks				
RISKS	All identified Medium/High Risk items have mitigation strategies/plans	One or More Medium Risk items w/o a Mitigation Strategy Plan	One or More High Risk items w/o a defined mitigation strategy/plan	Tied to Risk Management Methodology. If risk management plan is not in place or no evidence that it is being followed, then RED
Requirements Management				
Interface Identification	93% or More Identified	83-92% Identified	Only 82% or Less Identified	Derived from Differential Analysis of COCOMO II Cost Factors (change of 17% in requirements equates to 10% chance in cost/schedule
Interface Stability	Change Rate of 8 % or Less	Change Rate of 9-17 %	Change Rate of 18 % or Greater	Derived from Differential Analysis of COCOMO II Cost Factors (change of 17% in requirements equates to 10% chance in cost/schedule
Functional Requirements Definition	93% or More Identified	83-84% Identified	Only 82% or Less Identified	Derived from Differential Analysis of COCOMO II Cost Factors (change of 17% in requirements equates to 10% chance in cost/schedule
Functional Requirements Stability	Change Rate of 8 % or Less	Change Rate of 9-17 %	Change Rate of 18 % or Greater	Derived from Differential Analysis of COCOMO II Cost Factors (change of 17% in requirements equates to 10% chance in cost/schedule
Test and Evaluation				
TEMP	Approved / Up to Date	Approved / Update Required or In Draft Form	Not Available or will not support Testing Program	Key document that outlines testing approach. Problems getting this document done and approved indicated problems/chum in the TSE area.
Test Deficiency Reports (TDR's)	Level 3 TDRs Only	One or More Level 2 TDRs	One or More Level 1 TDRs outstanding	Severity/Quantity of outstanding TDR's indicates overall usability/appropriateness of final product
Test Environment	Available Now	Will be available to support testing	Not available or requirements not identified	Successful identification and set up of representative test environment is a key prerequisite to successful completion of TSE.
OT&E Results	Operationally Effective / Suitable	Operational Effective / Suitable Retesting Required	Not Operationally Effective or Suitable	Final grade says it all

Source: Defense Logistics Agency (Department of Defense 5000 Series, COCOMO Model (Boehm et. al)). ***NOTE****: This chart has been edited of program-specific information for presentation purposes. Used with permission.*

Comprehensive Reporting Model for Government Agencies

Performance	Green	Yellow	Red	Rationale
Management Structure				
Personnel Availability/Skill Levels	All key program positions filled/personnel meet requirements for positions held	One or more key program positions unfilled/ requirements met for filled key program positions	50 % or less of Key Program Staff meet requirements	COD and DLA Policy
Organization Structure	Clear Delineation of Responsibilities exists in writing. PM has responsibility and authority for program	Some question on delineation of responsibilities. PM lacking responsibility or authority in one or more areas	No Clear Delineation of Responsibility and authority	Delegation normally in the form of an MOA or Charter
Program Management Controls	All required controls have been implemented and are up to date	One or more required controls not implemented or are not up to date	Required controls have not been implemented	Program control processes include: Integrated Program Plan/Processes, Budget/Spending Plans, Risk Management Plans/Processes, Current Cost Estimates, Requirements Identification & Management and Program Performance Metrics. Required controls dictated

Source: Defense Logistics Agency (Department of Defense 5000 Series, COCOMO Model (Boehm et. al)). ***NOTE****: This chart has been edited of program-specific information for presentation purposes. Used with permission.*

Appendix VI

Examples of Recommended Status Report Measures

Explanation: The Balanced Scorecard[1] approach is becoming a recognized industry best practice as a tool for improving strategic planning. The Balanced Scorecard supplies a framework to translate a strategy into operational terms. The Scorecard includes four dimensions, or components. These components are as follows.

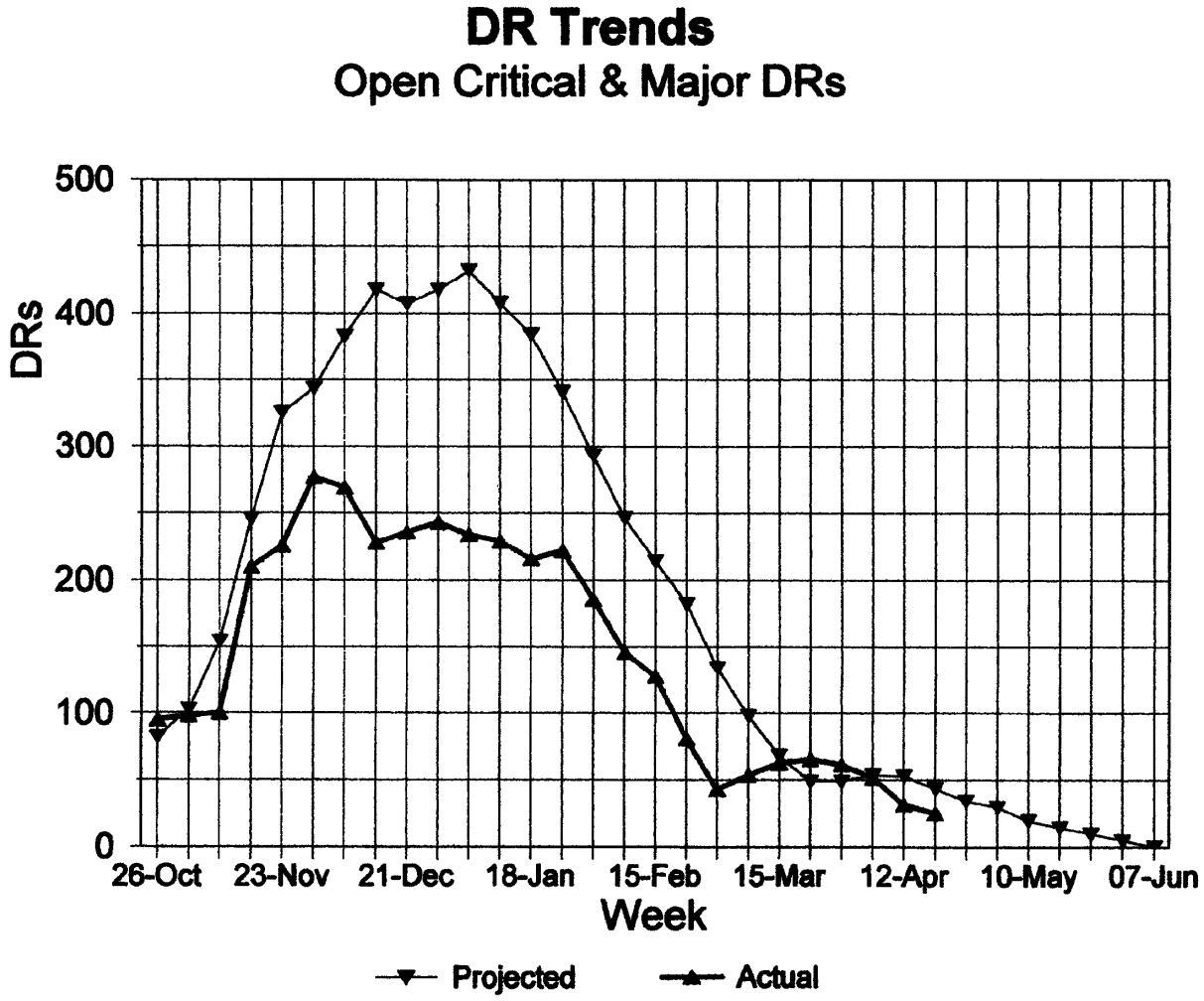
- **Internal Business Process** – "To satisfy our shareholders and customers, what business processes must we excel at?"
- **Innovation and Learning** – "To achieve our vision, how will we sustain our ability to change and improve?"
- **Customer** – "To achieve our vision, how should we appear to customers?"
- **Financial** – "To succeed financially, how should we appear to our stakeholders?"[2]

[1] Robert S. Kaplan and David Norton published, in the mid 1990's, several articles on the Balanced Scorecard in the Harvard Business Review.
[2] *The Balanced Scorecard*, Robert S. Kaplan and David Norton (Harvard Business School Press, 1996).

Examples of Recommended Status Report Measures

Internal Business Measures

Explanation: The number of defects (deficiencies found in software products) could be used to measure the quality of software development and testing. This chart reflects a 32-week trend in defect reports (DR), or deficiency reports.

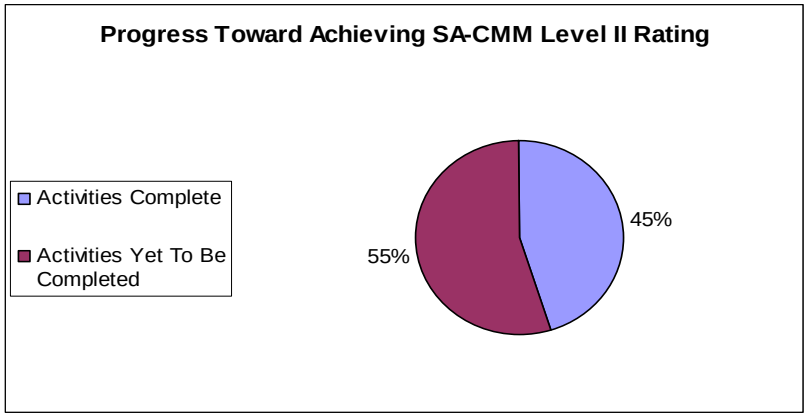


Source: Department of the Commerce. ***NOTE****: This chart has been edited of program-specific information for presentation purposes. Used with permission.*

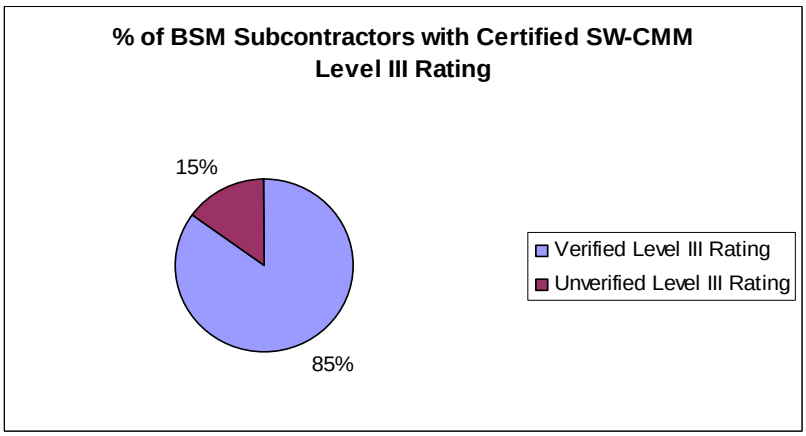
Examples of Recommended Status Report Measures

Innovation and Learning Measures

Explanation: Attainment and verification of Capability Maturity Model[3] levels could be measured to show the Business Systems Modernization (BSM) program's maturity.



Projected Internal Capability Rating: June 2002
Projected Capability Rating: December 2002



Source: These charts are illustrations only and do not contain actual data.

[3] The Capability Maturity Model is a service mark of Carnegie Mellon University. The model is a structured process that helps organizations improve their abilities to consistently and predictably acquire and develop high-quality information systems.

Examples of Recommended Status Report Measures

Innovation and Learning Measures

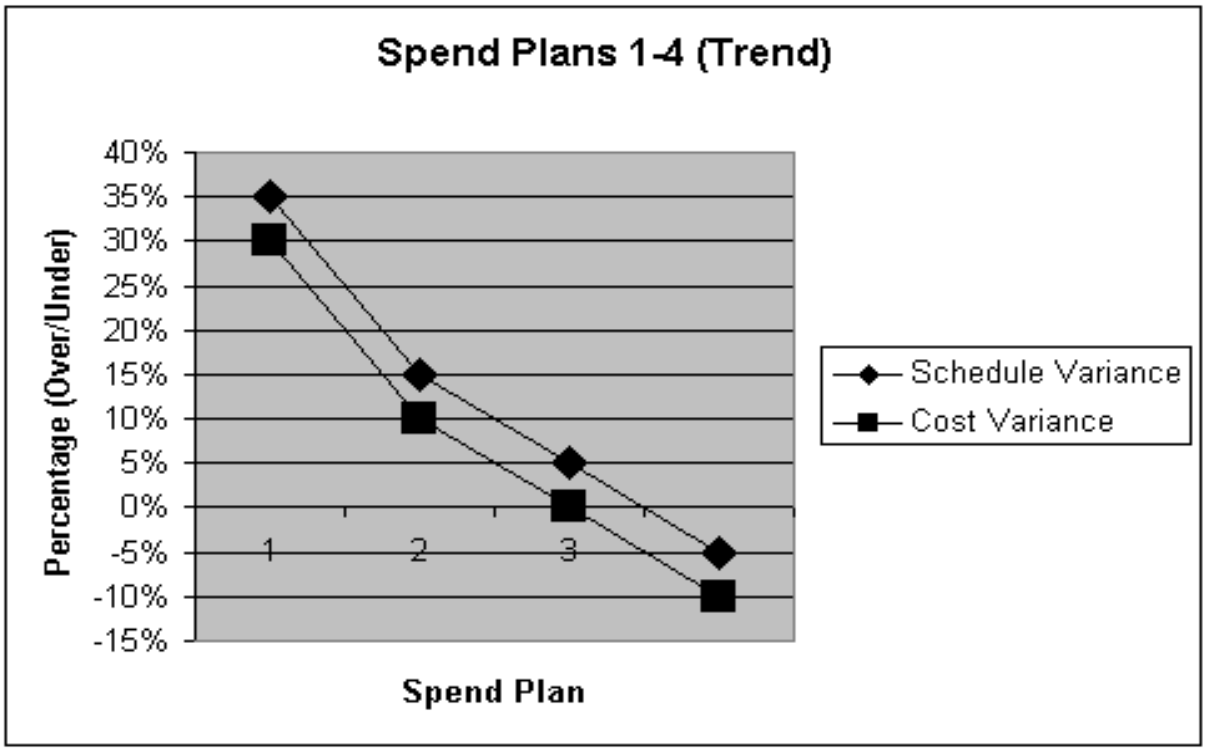
Explanation: This bar chart of audits of internal processes could be used to show how well processes are being followed. The reason codes listed on the horizontal axis represent process problems identified during audits. When these charts are produced periodically, a trend can be observed. As a process becomes more mature, the total number of findings may decrease and the reasons may change. For instance, if reason code one is " lack of documentation" and reason code five is "process quality is not enforced", you would expect to see reason code one problems disappear and reason code five problems to decrease as an organization matures.

Source: "Measuring Acquisition Processes", Wolfhart Goethert, ©2002 by Carnegie Mellon University. Used with permission.

Examples of Recommended Status Report Measures

Customer Measures

Explanation: This is a chart reflecting program cost/schedule measures against past expenditure (spend) plans. This chart could be used to indicate a trend in meeting (or not meeting) past cost/schedule goals. In this example chart, the trend shows that schedule and cost variances within each expenditure plan have steadily decreased.

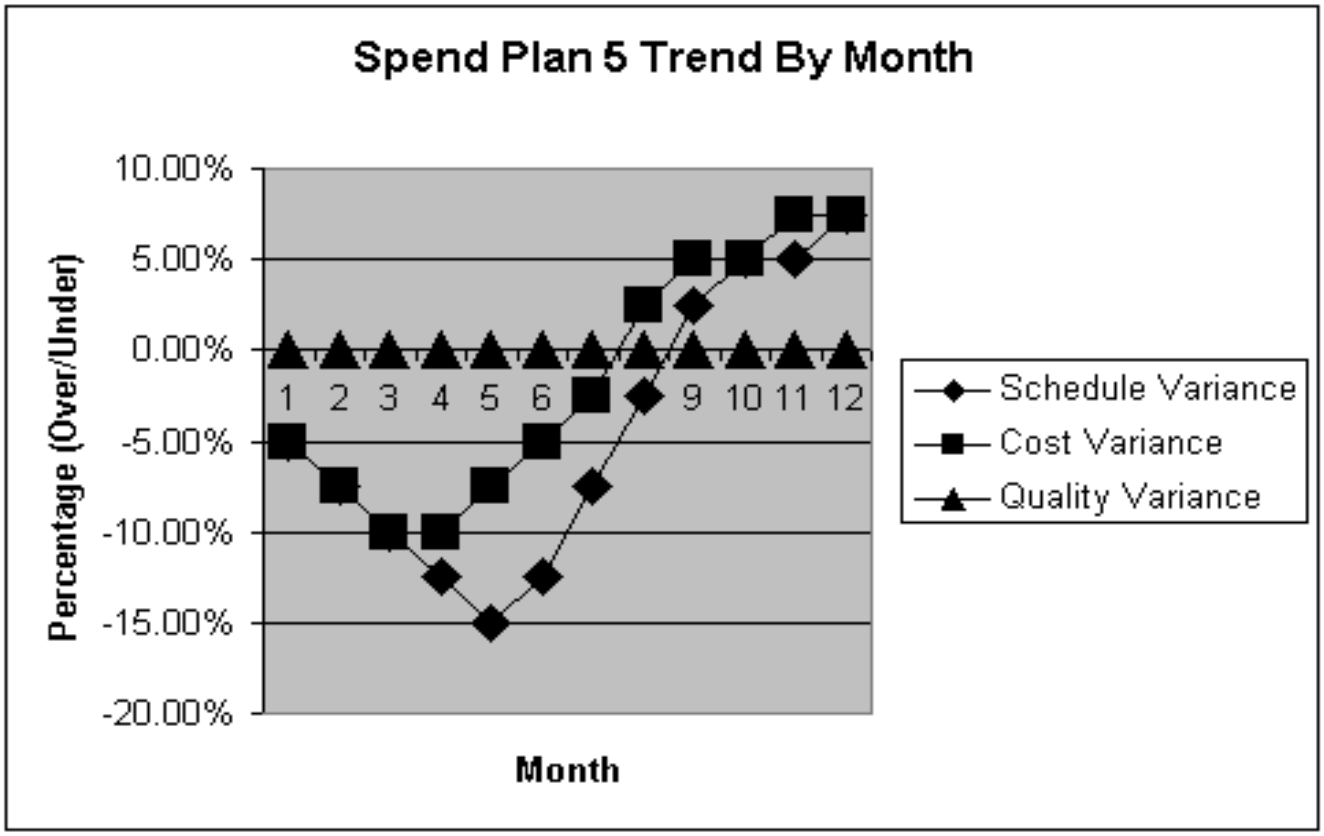


Source: This chart is an illustration only and does not contain actual data.

Examples of Recommended Status Report Measures

Customer Measures

Explanation: This is a chart reflecting program cost/schedule measures against current expenditure (spend) plans. This chart could be used to indicate a trend in meeting (or not meeting) current cost/schedule goals. Once developed, quality measures could also be included. In this example chart, the program is under cost and ahead of schedule (percentages are below 0) for January through approximately July/August. However, beginning in August/September the program begins to exceed expenditure plan cost and schedule goals (percentages begin to creep above 0).

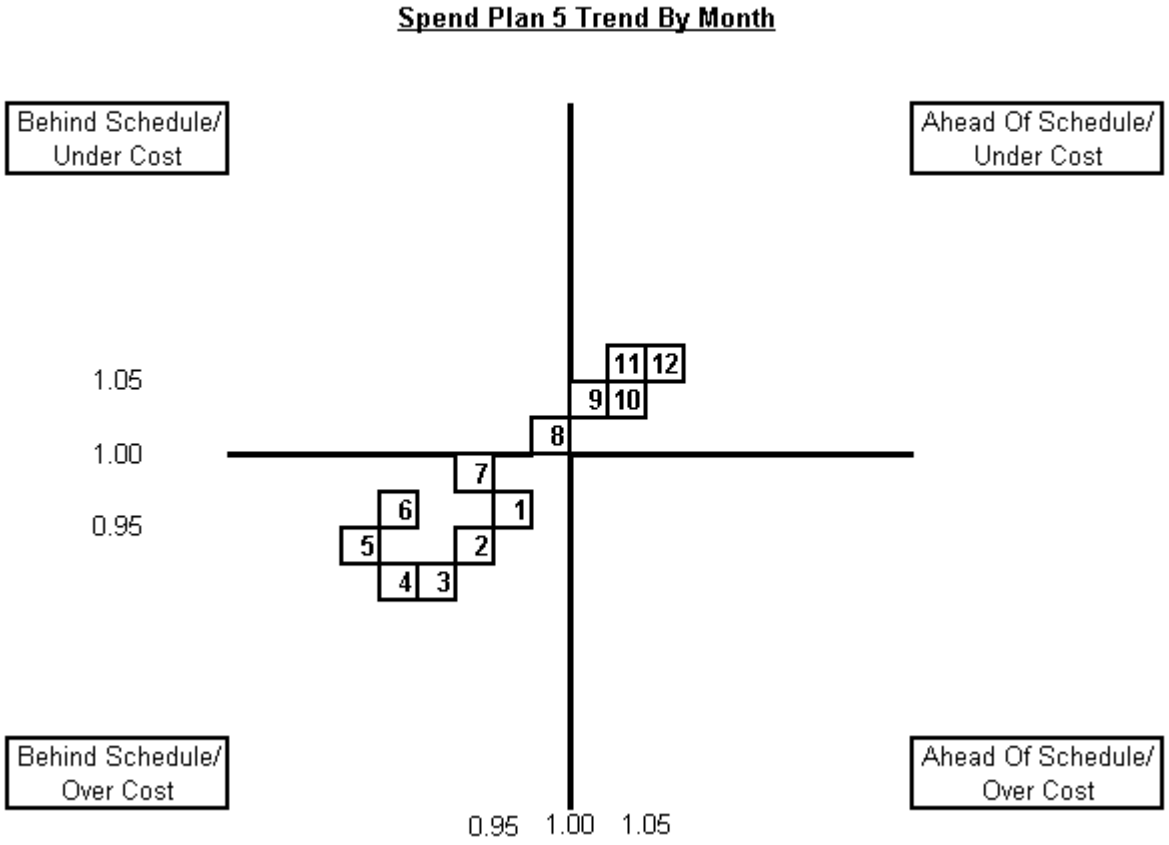


Source: This chart is an illustration only and does not contain actual data.

Examples of Recommended Status Report Measures

Customer Measures

Explanation: This is a chart reflecting program cost/schedule measures against the current expenditure (spend) plan. The numbers shown indicate the month. This chart could be used to indicate a trend in meeting (or not meeting) current cost/schedule goals. In this example chart, the program is getting more and more behind schedule and over cost for the first four months. The program then begins correcting itself and ends up ahead of schedule and under cost by the twelfth month.

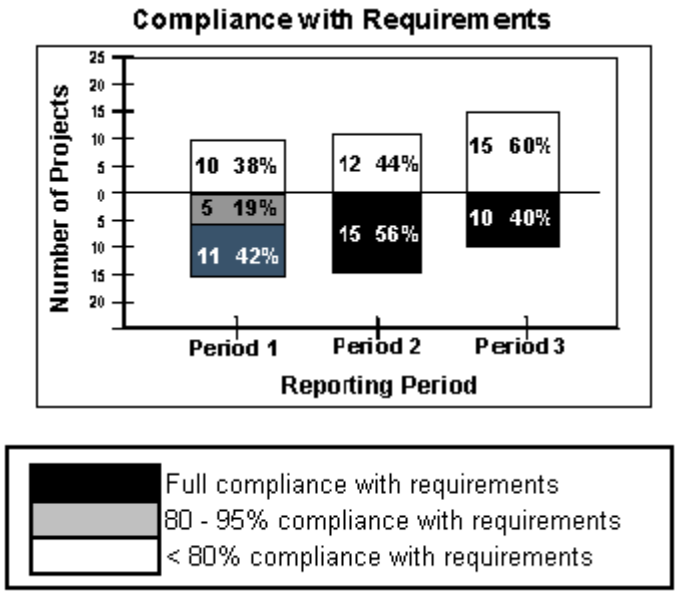


Source: This chart is an illustration only and does not contain actual data.

Examples of Recommended Status Report Measures

Customer Measures

Explanation: This chart represents the percentage of requirements that projects are adhering to (all requirements, most requirements, few requirements).



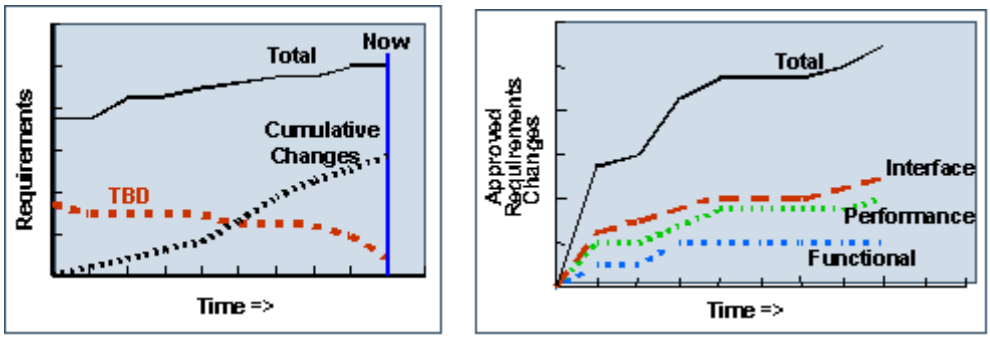
Source: "Measuring Acquisition Processes", Wolfhart Goethert, ©2002 by Carnegie Mellon University. ***NOTE****: This chart has been edited for presentation purposes. Used with permission.*

Examples of Recommended Status Report Measures

Customer Measures

Explanation: These charts could be used to measure the percentage and type of requirements that have been changed. These measurements would indicate the stability of user requirements.

Compliance with Requirements



Source: "Measuring Acquisition Processes", Wolfhart Goethert, ©2002 by Carnegie Mellon University. Used with permission.

Examples of Recommended Status Report Measures

Customer Measures

Explanation: These charts are a representation of quality measures. The number of deficiencies found during testing could be measured to indicate the quality of software development activities.

Open and Closed Deficiencies

		PRIORITY					
		1		2		3	
		Open	Closed	Open	Closed	Open	Closed
SEVERITY	1						
	2						
	3						
	4						
	5						

Number of Deficiencies That Have Been Open x Days

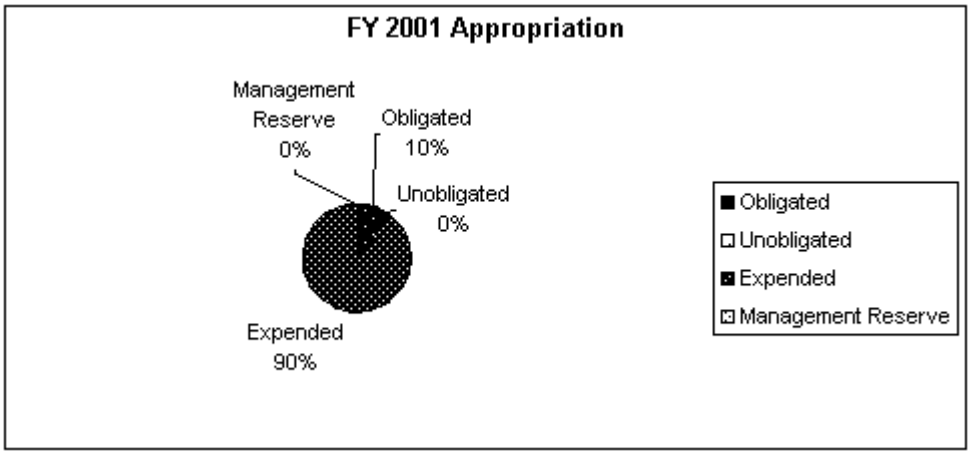
Severity Levels	x < 30	30 < x ≤ 60	60 < x ≤ 90	x > 90	Totals
Severity 1	2	1			3
Severity 2	3	1	1		5
Severity 3	3	2	1	1	7
Severity 4	4	3	3	2	12
Severity 5	8	6	3	3	20
Totals	20	13	8	6	47

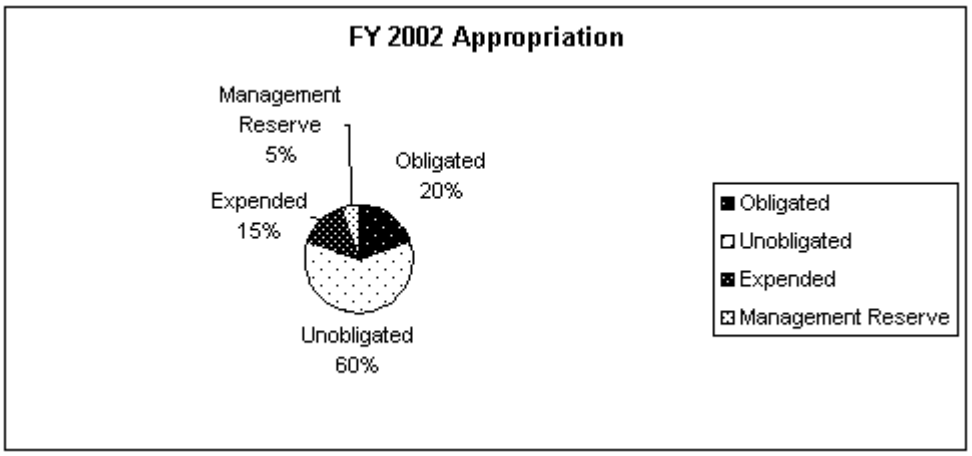
Source: "Measuring Acquisition Processes", Wolfhart Goethert, ©2002 by Carnegie Mellon University. Used with permission

Examples of Recommended Status Report Measures

Financial Measures

Explanation: These charts, as well as the charts on the next two pages, are examples of status of funds measurement. A chart similar to one of these could be adapted to reflect the amount of funds remaining that were allocated to the IRS.





Source: These charts are illustrations only and do not contain actual data.

Examples of Recommended Status Report Measures

Financial Measures

Explanation: This chart is another example of status of funds measurement. A chart similar to this could be adapted to reflect the amount of funds that were allocated to the IRS.

Funding ($M)

APPN	FY	FUNDS STATUS ($)			OBLIGATIONS (%)			EXPENDITURES (%)		
		APROP	Rels'd	TOTAL RQRD	GOAL	F'cst	Act'l	GOAL	F'cst	Act'l
	FY02	69.166	45.847	69.166	23.0%	15.1%	15.1%	14.0%	1.8%	1.8%
	FY01	144.659	144.659	144.659	93.0%	98.6%	98.6%	64.0%	74.2%	74.2%
	FY02	398.034	280.255	398.034	20.0%	25.2%	25.2%			
	FY01	349.006	349.006	349.006	83.0%	92.4%	92.4%			
	FY00	363.860	363.860	363.860	93.0%	98.4%	98.4%			
TOTAL	FY02	1324.725	1183.627	1324.725						

Source: Department of the Air Force. ***NOTE****: This chart has been edited of program-specific information for presentation purposes. Used with permission.*

Examples of Recommended Status Report Measures

Financial Measures

Explanation: This chart is another example of status of funds measurement. A chart similar to this could be adapted to reflect the amount of funds remaining that were allocated to the IRS.

PROGRAM OVERVIEW

($K)

	FY 98 and Prior Actual Oblig	FY 99 Approp.	FY 99 Thru Sys Deployment & Build	Total Capped Program
Definition Phase	**18,543**	**0**	**0**	**18,543**
Program Office	**39,030**	**7,281**	**7,248**	**46,278**
Program Management	33,696	2,462	2,305	36,001
Contingency	0	3,919	4,121	4,121
Allocation	5,333	900	823	6,156
Development	**275,621**	**15,555**	**17,055**	**292,676**
Contractor	122,812	6,264	6,264	129,076
Government	102,248	8,053	9,553	111,801
NOAA	23,499	0	0	23,499
Support Contracts	27,062	1,238	1,238	28,300
Deployment	**129,274**	**43,946**	**43,946**	**173,219**
Contractor	118,699	37,709	37,709	156,408
Government	9,716	5,427	5,427	15,143
Support Contracts	859	810	810	1,669
O&M	**9,992**	**13,074**	**8,843**	**18,835**
Contractor	0	4,579	3,053	3,053
Government	0	4,255	961	961
Communications	5,246	2,840	3,495	8,741
NOAA	4,746	1,400	1,333	6,079
Total	**472,459**	**79,856**	**77,091***	**549,551**

* Includes recurring lifecycle costs through August 1999.

Source: Department of the Commerce. ***NOTE****: This chart has been edited of program-specific information for presentation purposes. Used with permission.*